British Columbia Regional Socio-Economic Indicators – Methodology

BY BC STATS – UPDATED JULY 2013

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1. Introduction

Global economic pressures are having significant economic and social impact on British Columbia. Stresses are being felt particularly in communities traditionally dependent upon primary production in the forestry, fishery and mining industries for employment and social stability. At the same time, fiscal challenges faced by governments at all levels demand effective targeting of limited government resources to assist the communities to diversify local and regional economies in the changing global market place. Government decision-makers need new and better tools to clearly identify:

- Communities and regions most at risk due to economic changes,
- The most effective investments for limited government resources, and
- Progress and best practices in the identified areas

In general, data and information on socio-economic conditions are not as well developed at regional levels compared to the provincial or national levels. Given the fact that economic and social conditions that are summarized through provincial level statistics are not likely to accurately reflect all regions within the province, a data gap existed with respect to our knowledge and understanding of regional conditions. In support of this initiative, BC Stats, in co-operation with the social ministries, has developed a comprehensive set of over 80 indicators describing socio-economic conditions across various regions within British Columbia. However, compounding the problem of data quality and availability at the regional level is the difficulty faced by decision-makers to effectively synthesize large volumes of data across many regions. Hence, a method was needed to summarize the various indicators into a useful and accessible package for policy makers.

This report provides a synopsis of the methodology developed by BC Stats for producing the summary indicators of social and economic conditions for regions within British Columbia. The aim of this project is to expand the availability and use of regional data for decision-makers.

For this project, two geographic types (28 Regional Districts and 84 Local Health Areas) were selected for data development purposes. Maps of these regions are provided in Appendix A.

As noted above, there are 28 Regional Districts in British Columbia ranging in population size from 1,400 to over 2.0 million. Due to problems of data availability and quality, the two smallest regional districts of Central Coast and Stikine have not been included in the indexing methodology. Similarly, in the case of Local Health Areas, four

regions have been excluded – 87 Stikine, 94 Telegraph Creek, 51 Snow Country, and 83 Central Coast. The sub-Vancouver (LHAs 161-166) and the sub-Surrey (LHAs 201 and 201) have been aggregated. Also, two regions, 72 Campbell River and 84 Vancouver Island West were combined.

1.1. The Indicators

Four basic indicators of regional hardship were developed, each being a composite of three or four variables. These four indicators have been labeled:

- Index of Human Economic Hardship
- Index of Crime
- Index of Health Problems
- Index of Education Concerns

Two additional indicators that highlight the "target groups" of children and youth were also developed, bringing the overall total to six indicators.

In addition to the data variables that compose the six indicators noted above, supplementary data variables have been compiled for background information, but have not been directly included in the calculation of the index. A complete list of the data variables that make up the various indices is provided on page 6.

The details of the methodology are summarized over the remainder of this report. However, there are a number of points that should be clarified before proceeding.

First, the developed indicators are intended only to flag differences occurring at the regional level. They are not intended as a substitute for analysis, but rather are a necessary first step to understanding the factors underlying observed differences. As such, no attempt has been made to explain why some regions rank better than others.

Second, the design of the various indices is intended to provide cross-sectional analysis at a point in time. The developed indices are not designed for temporal analysis. Hence, comparing index values from one "time slice" to the next could produce misleading results. For example, a drop in an index value for a particular region from 0.50 to 0.30 does not necessarily mean an improvement in conditions within the region. The change may be due to other areas becoming relatively worse off.

Finally, when selecting data variables to include in the construction of the composite indicators, the following criteria were used:

- the data variable must be available for all regions within the province,
- the data variable should be an unbiased reflection of regional conditions,
- the data variable should be consistent (i.e. robust),
- the data variable should be timely, and
- the data variables should, in general, not be highly collinear.

Hence, the data series that have been used in the construction of the index are not necessarily the "best" ones, but rather are ones that are available and meet the above criteria.

1.2. Computing the Composite Index

As noted earlier, three or four data series are included in each of the composite indices. The choice of which variables reflect regional differences the best is key.[1] Ideally, the variables chosen will measure concepts that are not primarily the cause or the effect of one another.

Once the variables have been chosen, then the decision has to be made as to its relative importance. When calculating the composite index, a "weight" is applied to each of the variables that reflects the relative importance in the overall index. The sum of these weights must equal one.

In order to be added together, the variables used in each of the composite indices were standardized. This was accomplished by examining the variability of values relative to the interquartile range.[2] For each variable, the index value for each region is defined as the deviation from the median value, standardized by the interquartile range. The formula is:

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[1] In order to ensure consistency, all variables are expressed in terms of negative outcomes. Hence, a large number represents a negative condition while a low number is indicative of positive performance. This has resulted in some variables being expressed in a non-conventional manner. For example, education indicators are expressed as *non-completion* rates rather than the usual completion rates.

[2] Standardizing by the interquartile range was recommended by Michael Wolfson, Director General, Institutions and Social Statistics Division, Statistics Canada, Ottawa. The interquartile range is the difference between the 75th and 25th percentile values. This measure of dispersion is less affected by extreme values than the standard range.

$I_j = (D_j - D_{Median})/(D_{25th} - D_{75th})$

where:

I_j is the index value for region j,[3]

D_j is the data observation for region j,

D_{Median} is the median observation for data variable D, and

D_{25th}, D_{75th} are the 25th and 75th percentile observations for data variable D.

The range of the index will fall somewhere between –1.0 and +1.0 (except for the outliers – see footnote 3 above), where the worst-off region will have the largest positive value, the best-off region will have the largest negative value and the median will equal zero.

As an example, the *Indicator of Human Economic Hardship*, contains three variables:

- Per cent of the 0 to 64-year-old population receiving income assistance (IA) for more than one year.
- Per cent of the 0 to 64-year-old population receiving income assistance for less than one year.
- Per cent of the 65 and over population receiving the Maximum Guaranteed Income Supplement (GIS).

The index value for the per cent of population aged 0 to 64 receiving income assistance for more than one year in Nanaimo would be calculated as follows:

$(6.5 - 4.2) / (4.800 - 3.125) = (1.373)^{0.25} = 1.08$

where:

per cent receiving income assistance for more than one year in Nanaimo = 6.5%

median value over all regions = 4.2%,

1st quartile = 4.800%, and

3rd quartile = 3.125%

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[3] The formula was further refined to tone down the index value for outliers. An outlier was defined as an index value with an absolute value greater than two times the interquartile values (> +1.0 or <–1.0). In such cases, the fourth root of the index value was used; i.e., If I_j>+1.0, then $I_j = (I_j)^{0.25}$, If I_j<–1.0, then $I_j = (I_j)^{0.25} \times -1$.

The weight on the "income assistance (IA) more than one year" variable is 0.5, so the equation for the composite index of *Human Economic Hardship* would be:

$$\text{Composite Index} = ((0.5 \times 1.08) + (0.25 \times 1.09) + (0.25 \times -0.46)) = 0.70$$

IA > 1 IA < 1 GIS

1.3. Computing the Overall Index

A summary of the six indices noted earlier is called the *Overall Regional Socio-Economic Index*. It is a weighted average of each of the six sub-indices. The weights assigned to each sub-index are discussed later in this report. A summary of the data variables and weights assigned is contained on the next page.

1.4. Regional Population Data

The population data used as the denominator in the calculation of many of the rates were prepared by BC Stats through a regional population estimation model that has been developed and refined over the past 30 years. This model, which uses indicators of population change such as residential electrical connections and the number of clients in the B.C. Health Client Registry, has enabled BC Stats to produce relatively accurate population estimates without the high cost of conducting a census. For a detailed description of this methodology see, "*Generalized Estimation System (GES) – Small Area Population Estimation Method and Error Evaluation, August 2011*", available through the BC Stats web site at:

http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/TechnicalPapers.aspx

In all cases, the population data used to normalize the various data variables across regions is intended to reflect the resident population in the region and is not intended to reflect the non-resident, or transient population such as tourists and some types of seasonal workers.

2. Overall Socio-Economic Index

2.1. Purpose

To summarize the results of the six composite indices by providing an overall weighted average of Economic Hardship, Crime, Health Problems, Education Concerns, Children at Risk, and Youth at Risk.

2.2. Composite Index and Rationale for Weights

The weights currently used are as follows:

- Economic Hardship (weight = 30 per cent)
- Crime (weight = 20 per cent)
- Health Problems (weight = 20 per cent)
- Education Concerns (weight = 20 per cent)
- Children at Risk (weight = 5 per cent)
- Youth at Risk (weight = 5 per cent)

The rationale for the weights:

There are four basic concepts being measured across regions: Economic environment, crime, health, and education. The economic environment is considered the most important and was assigned a weight of 0.30 with the other three given weights of 0.20. The target groups of children and youth, although they are included as part of the main indicators, were given an accentuated importance in the Overall Socio-Economic Index with an extra weight of 0.05 each.

3. Composite Index of Human Economic Hardship (30%)

3.1. Purpose

The purpose is to measure economic hardship by region.

3.2. Included Variables

Note: Variables identified with a ✓ are included in the composite index.

Economic Hardship of Non-Senior Population

- Per cent of population age 0 and over who are currently receiving income assistance (IA)

- ✓ *Per cent of population age 0 and over who are currently receiving income assistance continuously for over one year.*
- ✓ *Per cent of population age 0 and over who are currently receiving income assistance but for less than one year.*

Economic Hardship of Senior Population

- ✓ *Per cent of population age 65+ receiving the maximum Guaranteed Income Supplement.*

Other Economic Hardship Indicators

- Annual average per cent of population 15 and over receiving Employment Insurance.
- Per capita income from income tax records (Regional District); average household income, 2006 Census (Local Health Area).
- An indicator of income inequality - the top quintile's share of income compared to the bottom quintile's share of income for economic families from the 2006 Census.
- Per capita federal net taxes paid as recorded by CRA (Regional District).

3.3. Composite Index and Rationale for Weights

The weights currently used are as follows:

Economic Hardship of Population Less than 65 Years (75 per cent)

- As measured by the per cent of population age 0-64 receiving income assistance for more than one year *(weight = 50%)*.
- As measured by the per cent of population age 0-64 receiving income assistance for less than one year *(weight = 25%)*.

Economic Hardship of Population Greater than 65 Years (25 per cent)

- As measured by the per cent of population age 65+ receiving the maximum Guaranteed Income Supplement.

Rationale:

As this measure is intended to represent the extent of economic hardship of the population across the regions, the counts of those who are receiving government income assistance are considered to be the best measure currently available.

The income assistance program delivered by the Ministry of Social Development and Responsible for Multiculturalism (called *BC Employment and Assistance* but referred to as income assistance or "IA" in this paper) covers the in-need population under the age of 65 years. The administrative data from this program are available with a lag of two to three months, and the eligibility requirements are consistent across all regions of the province. The shortcomings of these data are that they exclude the "working poor" or those who may be in dire financial straits but are not receiving income assistance.

For the purpose of the Index, the income assistance data is segmented into those who are long-term IA recipients (more than one year) and those who are short-term. There are two reasons for segmenting in this way. One is that long-term dependency on IA is considered to represent a more serious hardship, while short-term dependence may be the result of an unusual circumstance that will rectify itself in a few months. Thus, the long-term IA is given twice the weight (50%) as the short-term IA (25%) in the index. The other reason for segmenting the data is to better understand the dynamics of economic hardship in a region. Short-term IA levels could simply be a function of the demographic makeup of the population or alternatively the job structure of the local economy. For example, a region with many young people working in temporary jobs may see large flows on/off IA as job prospects fluctuate over the year. On the other hand, high levels of short-term IA recipients could be a warning of worsening times, if short-term recipients turn into long-term recipients.

The Federal Government's Guaranteed Income Supplement (GIS) program provides income assistance to all needy seniors who have lived in Canada for at least 10 years since turning 18 years of age. Human Resources and Skills Development Canada maintains a file of all seniors who are currently receiving GIS (both partial and full supplement). BC Stats obtains an update of this file every June. The weight applied to seniors in receipt of the maximum GIS is 25 per cent. Approximately 32 per cent of BC seniors receive a GIS supplement, but the indicator used includes only the 4 per cent of severely needy seniors - i.e. those who receive the maximum benefit.

The variables included as "Further Information", but are not included in the Index are intended to provide further insights into regional differences. The Canada Revenue

Agency (CRA) data (for Regional Districts) on income and taxes/transfers are not included in the weighted variables because the numbers are generally two years out of date. In addition, the data is based on individuals' returns, while economic hardship should be measured within the framework of some kind of economic unit concept (usually the family). The 2006 Census average household income are included for Local Health Areas as the CRA data is not available for this geography; the data is for the 2005 calendar year and not timely enough to be considered. "Income Inequality" is included on the assumption that the extent of the hardship associated with being poor is somewhat dependent on how well-off your neighbours are in your community. Unfortunately, data is only available from the 2006 Census and hence will be three to eight years out of date. The number of Employment Insurance (EI) recipients is a good economic indicator but it does not necessarily represent economic hardship. Persons laid off from high wage seasonal jobs are likely not "poor". Furthermore, two regions with the same levels of unemployment may have large differences in the number eligible for EI. In such a case, the region with the higher EI rate would be the more fortunate region.

4. Composite Index of Crime (20%)

4.1. Purpose

The purpose is to measure the extent of criminal offences committed in a region and use this as a proxy measure of the attitude of the resident population toward personal safety. The incidence of crime (or the probability that an individual will be the victim of crime), the recent increase or decrease in this incidence of crime, and police strength are used to measure the perception of relative personal safety between regions.

4.2. Included Variables

Note: Variables identified with a ✓ are included in the composite index.

Exposure to Serious Property Crime[4]

- ✓ *Three-year average of number of serious property crimes (i.e. breaking and entering) per 1,000 population.*

[4] Breaking and Entering is the only property crime included in "serious". Property crimes excluded are Motor Vehicle Theft and minor crimes such as bicycle theft, pickpocketing, and theft from motor vehicles.

- Three year average of motor vehicle theft per 1,000 population.

Exposure to Serious Violent Crime[5]

✓ *Three-year average of number of serious violent crimes (i.e. crimes involving a weapon, sexual assaults resulting in bodily harm, non-sexual assaults resulting in serious injury and abductions) per 1,000 population.*

Other Crime Indicators

- Three-year average of total serious offences (property and violent) per 1,000 population
- Change in the total serious crime activity (serious property and serious violent) as measured by the most recent three year average of total serious crime compared to the previous three-year average.
- Change in serious violent crime as measured by the most recent three-year average compared to the previous three-year average.
- Change in serious property crime as measured by the most recent three-year average compared to the previous three-year average.

✓ *Number of serious crimes per police officer.*

- Three-year average of juveniles charged for serious violent crime per 1,000 population age 12-17.
- Three-year average of juveniles charged for serious property crime per 1,000 population age 12-17.
- Three-year average of non-cannabis drug offences per 100,000 population.
- Three-year average of juvenile non-cannabis drug charges per 100,000 population age 12-17.
- Three-year average of total deaths due to illicit drug use per 100,000 persons age 19-64.

[5] Serious violent crime includes all crimes involving a weapon as well as sexual assaults resulting in bodily harm, non-sexual assaults resulting in serious injury and abductions.

4.3. Composite Index and Rationale for Weights

The weights currently used are as follows:

Serious Property Crime Indicator (50 per cent)

- As measured by the three-year average of the number of serious property crime offences committed in the region per 1,000 persons living in the region.

Serious Violent Crime Indicator (35 per cent)

- As measured by the three-year average of the number of serious violent crime offences committed in the region per 1,000 persons living in the region.

Number of Serious Crimes per Police Officer (15 per cent)

- As measured by the three-year average of the total number of serious crimes committed (property and violent) in the region per police officer assigned to the region.

Rationale:

Serious crime was isolated from total crime to try and eliminate any differences there might be in reporting minor infractions between regions and/or over time. For example, by far the majority of violent crime is categorized as Level 1, which is considered minor crime. Similarly, more than half of property crime is "Theft" which is primarily bicycle theft, shoplifting and theft from motor vehicles.

Serious violent and property crimes were split out as two separate variables. These two types of crime, although often highly correlated by region, are not perfectly so. There are many areas in BC with relatively high property crime alongside relatively low violent crime and vice versa. An example is Sunshine Coast, which in the 1995-97 time period, had one of the worst rates of serious property crime alongside one of the lowest rates for serious violent crime. For this reason, the two types of crime have been separated to better understand the regional dynamics of these variables. The split also allows for differential weights being applied to the two different types of crime to reflect the impact on the perception of personal safety.

The weights applied to the violent and property crime variables are somewhat subjective. In the current version of the indicators, the violent crime has a weight of 0.35 and property crime a weight of 0.50 (1.4 times the level of the violent crime). In reality, the property crime rate is about six times the level of the violent crime rate. Implicitly, by

placing relative weights of only 1.4 to one between property and violent crime, each violent crime is weighted three times the significance of each property crime. In other words, if the sum of property and violent crime were used as an indicator on its own, the implicit importance of violent crime in that measure would be only 14 per cent of that of property crime. In this weighting scheme, the weight of violent crime is increased to 42 per cent, meaning that each violent crime was increased three fold in relation to each property crime.

To shed further light on crime differences across the province, other variables are included but are not part of the index. These are: motor vehicle theft and number of juveniles charged for serious violent/property crimes, non-cannabis drug offences and the number of juveniles charged with non-cannabis drug offences. Deaths due to illicit drug use are also included to further augment the understanding of drug crime in the province. This latter indicator is a different concept from all the other crime indicators. While the intent of the crime index is to measure the crime committed in a region, the death due to illicit drug use is categorized according to where the victim lives. The extent to which drug users cross regional boundaries to buy their drugs could give distorted results as to the extent of illegal drug trafficking occurring in any particular region.

5. Composite Index of Health (20%)

5.1. Purpose

The purpose is to measure the comparative physical and mental health of the BC population by region.

5.2. Included Variables

Note: Variables identified with a ✓ are included in the composite index.

Physical Health

- ✓ *Five-year average of Standardized Potential Years of Life Lost per 1,000 population due to natural causes.*
- ✓ *Five-year average of Standardized Potential Years of Life Lost per 1,000 population due to accidental causes.*
- Five-year average of Infant Mortality Rates.

- Five-year average of Life Expectancy at Birth.
- Three-year average of teen (15-19) pregnancies per 1,000 women population. (Please note: in mid 2009, some facilities decided not to contribute their data to the Ministry of Health database. This has resulted in extreme volatility in the data both on a regional and provincial level and for this reason, we have excluded this indicator from the profiles and indices.)

Mental Health

- ✓ *Five-year average of Standardized Potential Years of Life Lost per 1,000 population due to suicide and homicide.*

5.3. Composite Index and Rationale for Weights

The weights currently used are as follows:

Physical Health (70 per cent)

- As measured by the five-year average of Potential Years of Life Lost due to Natural Causes per 1,000 persons living in the region.
  (weight = 40%)
- As measured by the five-year average of Potential Years of Life Lost due to Accidental Causes per 1,000 persons living in the region.
  (weight = 30%)

Mental Health (30 per cent)

- As measured by the five-year average of Potential Years of Life Lost due to Suicide/Homicide per 1,000 persons living in the region.
  (weight = 30%)

Rationale:

The Potential Years of Life Lost (PYLL) was used in place of other concepts of longevity because it is possible to separate this variable into the different causes of lost life. The Accidental and Natural Causes of death are shown separately as they measure very different concepts and are not necessarily correlated. Accidental PYLL is largely the result of job-related accidents and car accidents. Regions with a high concentration of primary and manufacturing jobs have relatively high job-related deaths, and it is probable that these regions would similarly have high disability rates due to job related

accidents. The suicide/homicide PYLL is separated out to capture some indication of differential mental health between regions. The weighting of these three variables within the composite index is somewhat subjective.

5.4. Potential Improvements

The indicator used for mental health, that is Potential Years of Life Lost to Suicide/Homicide, could be improved. It measures only one small part of mental health. Other possible measures could include, Medical Services Plan (MSP) counts of those using psychiatric services, those on Canada Pension Plan or Workers Compensation for mental health reasons, those receiving income assistance because of mental disability, etc. Not including indicators of alcoholism and drug addiction may also be a potential shortcoming.

6. Composite Index of Education (20%)

6.1. Purpose

The purpose is to measure the educational well-being of the population in a particular region. Many factors determine educational achievement. The quality of the education system is obviously one factor, but the home/community learning environment also has a strong influence on the motivation of children to learn. Therefore, it is felt that the overall learning environment plus the development of academic skills for youth are critical factors in determining the current and future educational well-being of the region. To capture these concepts, data on the educational attainment of the population age 25-54 (parent age), and K-12 academic achievement are used as the primary indicators.

6.2. Included Variables

Note: Variables identified with a ✓ are included in the composite index.

Learning Environment in the home and community:

- Per cent of population age 25-54 without high school graduation.
- ✓ *Per cent of population age 25-54 without completed post secondary education.*

Educational Status of today's 18 year olds:

- ✓ *Rate of Non-Graduates – per cent of the 18 year old population who did not graduate (2-year average).*

Quality of Graduates:[6]

- ✓ *Three-year average per cent of Grade 12 students who did not complete Math 12.*
- Three-year average per cent of Grade 12 students who did not complete Chemistry 12.
- ✓ *Three-year average per cent of Grade 12 students who did not complete English 12.*

Academic Achievement of the Children Currently in the K-12 System

- ✓ *% of students below standard for Grade 4 reading, writing and math (2-year averages).*
- % of students below standard for reading, Grades 4 and 7.
- % of students below standard for writing, Grades 4 and 7.
- % of students below standard for math, Grades 4 and 7.
- % of Grade 10 students (3-year average) who did not write or did not pass English 10.
- % of Grade 10 students (3-year average) who did not write or did not pass Principals of Mathematics 10.
- % of Grade 10 students (3-year average) who did not write or did not pass Science 10.

6.3. Composite Index and Rationale for Weights

The weights currently used are as follows:

Learning environment in the Home and Community = 40 %

- As measured by the per cent of adult (i.e. parent) population without completed post secondary credentials.

Educational Status of today's 18 year olds (two-year average) = 50 %

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[6] In order to ensure consistency, all variables are expressed in terms of negative outcomes. Hence, a large number represents a negative condition while a low number is indicative of positive performance. This has resulted in some education variables being expressed in a non-conventional manner (i.e. *non-completion* rates rather than the usual completion rates).

- Rate of non-graduates *(weight = 30%)*.

Non-completion rates[7] three-year average:

- English *(weight = 10%)*.
- Math *(weight = 10%)*.

Academic Achievement of the Children Currently in the K-12 System = 10%

- % of students below standard for reading (2-year average), writing (2-year average), and math (2-year average) in grade 4 (weight = 10%).

Rationale:

In most regions, the educational achievements of adults and children are highly correlated. However, there are regions where discrepancies exist. That is, the parents are well educated but the children are not. Under those circumstances, the graduation rates may not reflect the permanent education status of the region, but instead represent only a short-term condition. Some examples of this are:

- A regional economic boom enables teenagers to get good jobs so they drop out of school temporarily but will return to school when the local economy turns around.
- Teenagers get permanent jobs in the local mills and receive on-the-job post secondary training.
- There is a large underachieving transient youth population in the region who will not likely take up permanent residence. An example of this may be in the Squamish-Lillooet region, which is largely dominated by the Whistler "ski bum" culture.

Under such circumstances a poor rating on the high school graduation index should not cause as much alarm as the numbers may suggest. Hopefully, by including the educational attainment of the adult population in the equation, the long-term conditions in the region are better represented. Alternatively, the adult population should not be the only indicator in the composite index, as the school system can obviously alter the parent/child influence. When both these indicators are weak, the assumption is that the educational achievements in the region are, and will continue to be, relatively poor.

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[7] The non-completion rate is calculated as 100 minus the total number who passed the Provincial Exam as a per cent of the grade 12 enrolment at the beginning of the school year.

Other indicators shown that are not included in the composite index are the per cent of adult population without high school graduation, the non-completion rate for chemistry, and the separate % of students below standard for grades 4 and 7 in reading, writing and math. The former two are included in the document as background material only. In our opinion, these two variables are variants of other variables included in the composite index. The % of students below standard for grades 4 and 7 is a very important indicator of the progress of children through the K-12 system but these variables are thought to be highly correlated with the grade 12 achievement, particularly in the higher grades. Therefore only the aggregated grade 4 results were included in the weights. Furthermore, the reading % below standard are included as part of the "Children at Risk" indicator and accordingly have a weight in the overall "Socio-Economic Composite Index".

Data from the post secondary education system were not incorporated into this analysis. The reason is that post secondary students often do not study where they live. Thus, measures of the output of the post secondary schools do not necessarily gauge the educational achievements of persons who came through the region's K-12 system, nor of those who will live in the area in the future.

6.4. Potential Improvements

It would be of value to be able to measure the proportion of high school graduates in a region who continue on to post secondary education. This would be a proxy measure for a region's access to post secondary institutions as well as the learning the culture of the area.

7. Composite Index of Children at Risk (5%)

7.1. Purpose

The purpose is to provide additional indicators on the relative well-being of the children at the regional level.

7.2. Included Variables

Note: Variables identified with a ✓ are included in the composite index.

Economic Hardship of Children

- ✓ *Per cent of population age 15 and under who live in families receiving income assistance for more than one year.*
- ✓ *Per cent of population age 15 and under who live in families receiving income assistance for less than one year.*

Health of Children

- ✓ *Five-year average of infant mortality rate per 1,000 live births.*
- Three-year average of teen pregnancies per 1,000 women population age 15-19. (Please note: in mid 2009, some facilities decided not to contribute their data to the Ministry of Health database. This has resulted in extreme volatility in the data both on a regional and provincial level and, for this reason, we have excluded this indicator from the profiles and indices.)
- ✓ *Children in care per 1,000 population age 0-18.*
- Incidence of child abuse per 1,000 population age 0-18.
- Hospitalization rates per 1,000 population age 0-14 due to injury and poisoning.
- Hospitalization rates per 1,000 population age 0-14 due to respiratory diseases.

Education of Children

- ✓ *Two-year average % of students below standard in reading for grades 4 and 7.*

Crime and Children

- ✓ *Three-year average juvenile serious crime – charges per 1,000 population age 12-17.*
- Three-year average juvenile serious violent crime – charges per 1,000 population age 12-17.
- Three-year average juvenile serious property crime – charges per 1,000 population age 12-17.
- Three-year average juvenile non-cannabis drug crime – charges per 100,000 population age 12-17.

7.3. Composite Index and Rationale for Weights

The weights currently used are as follows:

Economic Hardship of Children (30 per cent)

- As measured by the per cent of population age 15 and under receiving income assistance for more than one year *(weight = 20%).*
- As measured by the per cent of population age 15 and under receiving income assistance for less than one year *(weight = 10%).*

Education of Children (20 per cent)[8]

- % of students below standard in reading for grades 4 and 7 (two-year average).

Health of Children (30 per cent)

- As measured by the five-year average infant mortality rate per 1,000 live births *(weight = 20%).*
- As measured by children in care per 1,000 population age 0-18 *(weight = 10%).*

Crime Risk for Children (20 per cent)

- ✓ As measured by three-year average juvenile serious crime – charges per 1,000 population age 12-17.

Rationale

Indicators that measure the four principal components of the Overall Socio-Economic Index, (i.e. Economic Hardship, Crime, Health and Education) apply to children as well. The Economic Hardship indicators are explained in the section on "Composite Index of Human Economic Hardship". It was given a weight of 30 per cent because it measures not only economic hardship but also the family environment of probable low esteem and low self-motivation. The physical health of children is measured by a proxy for a disability rate of children, (i.e. infant mortality rate) and the mental health of children measured by the rate of children in care. Health was also given a 30 per cent

[8] In order to ensure consistency, all variables are expressed in terms of negative outcomes. Hence, a large number represents a negative condition while a low number is indicative of positive performance. One variable where this was not possible was "test scores" where a large number represents a positive outcome and vice versa. When this occurred, and the variable was used as part of the composite index, the sign of the index was reversed.

weight because of the additional component of mental health and security. Both education and crime were given a weight of 20 per cent. To measure children at risk in the education system, the ability to read is considered the most important skill to ensure success at school. Total serious juvenile crime and a summation of violent and property crime measures children's risk of getting involved in crime. This indicator for children's crime risk is a different concept to the one used in the overall Crime Index. The latter is used as an indicator of personal safety, whereas for Children at Risk it is used as an indicator of the risk of children being drawn into crime.

8. Composite Index of Youth at Risk (5%)

8.1. Purpose

The purpose is to provide additional indicators on the relative well-being of youth (those aged 19 to 24) at the regional level.

8.2. Included Variables

Note: Variables identified with a ✓ are included in the composite index.

Economic Hardship of Youth

- ✓ *Per cent of population age 15-24 who live in families receiving income assistance for more than one year.*
- ✓ *Per cent of population age 15-24 who live in families receiving income assistance for less than one year.*
- Per cent of population age 19-24 receiving Employment Insurance.
- Three-year average of net migration of population age 18-24 out of the region.

Health of Youth

- Hospitalizations due to motor vehicle accidents per 1,000 population age 15-24.

Education of Youth

- ✓ *Two-year average of per cent of 18 year olds who did not graduate from high school.*

Crime Risk for Youth

- ✓ *Three-year average of total serious crime – offences per 1,000 population (all ages).*
- Three-year average of non-cannabis drug offences – offences per 100,000 population (all ages).

8.3. Composite Index and Rationale for Weights

The weights currently used are as follows:

Economic Hardship of Youth (60 per cent)

- As measured by the per cent of population age 15-24 receiving income assistance for more than one year *(weight = 40%).*
- As measured by the per cent of population age 15-24 receiving income assistance for less than one year *(weight = 20%).*

Education of Youth (20 per cent)

- As measured by the per cent of 18-year-olds who did not graduate from high school (two-year average).

Crime Risk for Youth (20 per cent)

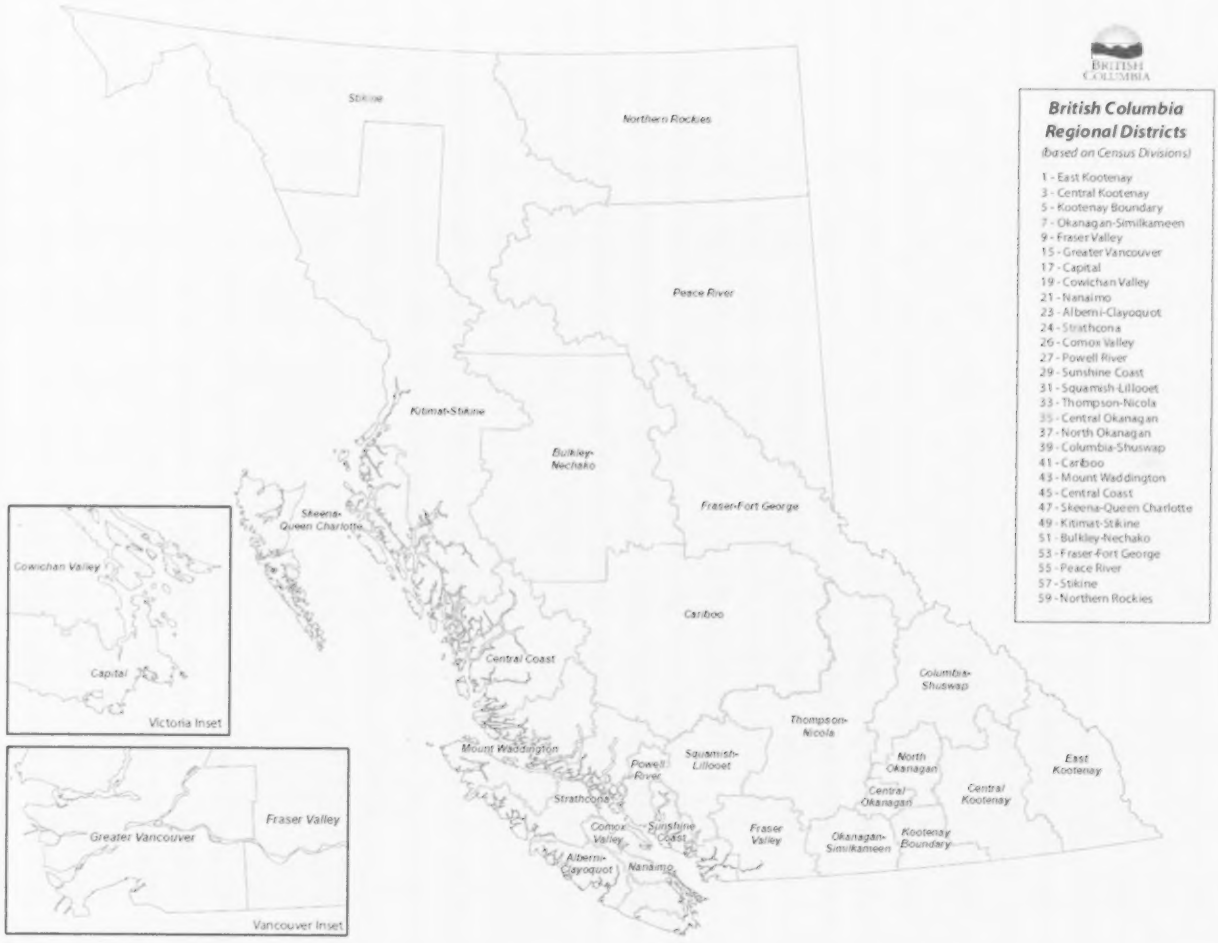
- As measured by the three-year average of the number of total serious crime offences for all ages per 1,000 population.

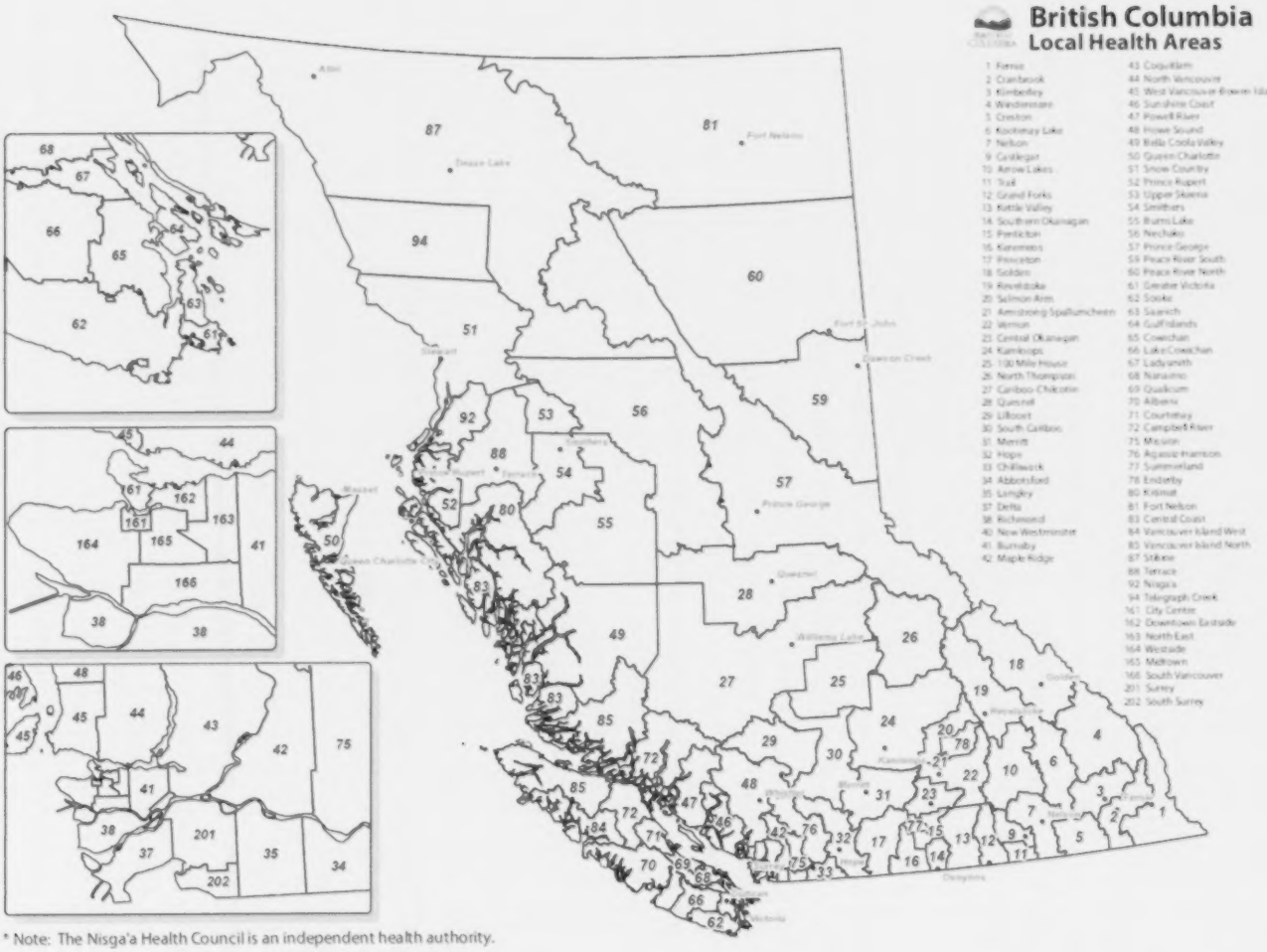
Rationale

Indicators that measure the four principal components of the Overall Socio-Economic Index, (i.e. Economic Hardship, Crime, Health and Education) apply to youth as well. The economic hardship indicators are explained in the section on "Composite Index of Human Economic Hardship". For youth, economic hardship was given 60 per cent of the total weight because it measures not only economic hardship, but also the lack of opportunity to gain work experience and to develop a work ethic. The other critical component of youth well-being is their level of education. The high school non-graduation rate is used as a proxy for the likelihood of youth in the region continuing on to post secondary education. The variable used as an indicator of crime is the total serious crime offences for all ages. The preference would have been to include the crime for only the 18-24 year age group, but that data is not available. However, those in the

18 to 24 year old age range are one of the main perpetrators of crime. Hence, the variable used likely reflects the risk of youth getting involved in crime. On the health side, the ideal measure to use for youth at risk is the smoking rate. Unfortunately, currently the data is not adequately robust at the Local Health Area level. The intent is to add this variable to the index in future years.

9. Appendix A


Stikine
Northern Rockies
Peace River
Kitimat-Stikine
Bulkley-Nechako
Fraser-Fort George
Skeena-Queen Charlotte
Cariboo
Central Coast
Columbia-Shuswap
Thompson-Nicola
Mount Waddington
Powell River
Squamish-Lillooet
North Okanagan
East Kootenay
Central Okanagan
Central Kootenay
Strathcona
Comox Valley
Sunshine Coast
Fraser Valley
Okanagan-Similkameen
Kootenay Boundary
Alberni-Clayoquot
Nanaimo
Cowichan Valley
Capital
Victoria Inset
Greater Vancouver
Fraser Valley
Vancouver Inset
BRITISH COLUMBIA
British Columbia Regional Districts
(based on Census Divisions)
1 - East Kootenay
3 - Central Kootenay
5 - Kootenay Boundary
7 - Okanagan-Similkameen
9 - Fraser Valley
15 - Greater Vancouver
17 - Capital
19 - Cowichan Valley
21 - Nanaimo
23 - Alberni-Clayoquot
24 - Strathcona
26 - Comox Valley
27 - Powell River
29 - Sunshine Coast
31 - Squamish-Lillooet
33 - Thompson-Nicola
35 - Central Okanagan
37 - North Okanagan
39 - Columbia-Shuswap
41 - Cariboo
43 - Mount Waddington
45 - Central Coast
47 - Skeena-Queen Charlotte
49 - Kitimat-Stikine
51 - Bulkley-Nechako
53 - Fraser-Fort George
55 - Peace River
57 - Stikine
59 - Northern Rockies



* Note: The Nisga'a Health Council is an independent health authority.

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